

Mr. Orr's book can confidently be recommended for this purpose.

The book is simply written and can be read without any extensive knowledge of English history: it is unbiassed and, for its size, it gives as good an account as we have yet seen of the course of events in British farming from the earliest times to the present day. The illustrations are excellent and well chosen from a wide range of sources: they show, side by side, the older and the newer types of implements or of animals, and afford admirable demonstrations of the great changes that have taken place since agriculture began to develop.

In discussing the post-war period Mr. Orr ends on a note of subdued optimism which we hope and believe is justified: "The market for farm produce is weak. Agriculture must share the bad fortune as well as the good fortune of the country and even of the world. In view of the magnitude of the war its evil effects will probably be very great and very prolonged. But however difficult times may be, there is promise for the future in the better feeling that exists between landlords and tenants, employers and employed, as compared with that which prevailed a century ago. There has been no poor-law payment of wages, and the difference between the treatment of the labourer then and now is an indication of the progress that has been made."

E. J. RUSSELL.

Ore Deposits.

Abriß der Lehre von den Erzlagernstätten: In Anlehnung an die dritte Auflage des Lehrbuches und unter Benützung hinterlassener Aufzeichnungen. Von Prof. Richard Beck. Bearbeitet durch Georg Berg. Pp. xi + 408. (Berlin: Gebrüder Borntraeger, 1922.) 16s. 8d.

AS is stated by Dr. Berg in his introduction, this work, an abstract of the study of ore deposits, is an abbreviation of the large work in two volumes by Richard Beck. The original work was well known, and three editions have been published since it was originally issued in 1900. The general principle of classification remains nearly the same as that in the original work, and it must be admitted that, generally speaking, the changes that have been made have not made for a clearer understanding of this exceedingly complex subject.

As in the original, a clear cut is made between epigenetic and syngenetic deposits; the author defines these phrases as follows: in the former he includes deposits into which ore has been introduced only after the formation of the immediately adjoining country rock, while the latter term is restricted to magmatic

segregation in which the ore is formed simultaneously with the country rock. These basal definitions, however, are by no means satisfactory. The author's definition excludes from the syngenetic group sedimentary deposits, such as beds of ironstone deposited originally as bog ironstone, etc., and in fact Dr. Berg has treated such deposits quite separately from his syngenetic deposits and has placed them in his classification after the epigenetic deposits. Dr. Beck, on the other hand, looked upon such ores as syngenetic, and there is no doubt that his view is the sounder and leads to a clearer understanding of the entire subject.

Again, Dr. Berg devotes a separate section to the Gozzans or alteration products of existing ore deposits, formed above permanent water level, which may include both secondary enrichment and impoverishment of the deposits in respect of their metallic contents. He classifies these deposits as epigenetic on the grounds that certain deposits are in themselves not worth working except in the zone of secondary enrichment; perhaps, strictly speaking, there is something to be said for this argument, but it certainly does not make for a clear understanding of the subject. If distinctions are to be drawn between the deposit itself and its more or less altered outcrop, confusion is bound to result. In fact, one of the great faults of the work lies in the author's failure to appreciate that in dealing with such phenomena as ore deposits, where a natural system of classification is practically impossible, broad lines must be followed; even so, there will be numerous border cases which every student of the subject will treat on somewhat different lines. One of the most striking points in the book, which well illustrates what has just been said, is the minute subdivision of mineral veins based upon differences, and sometimes small differences, in their mineral contents. In this Dr. Berg has followed Dr. Beck, the need for simplification apparently not having occurred to him. The whole of the treatment of mineral veins may be described as somewhat antiquated, seeing that over one-third of the work is devoted to fissure veins. This diffuse treatment is reminiscent of the days when the overwhelming proportion of all metallic minerals (with the exception of iron ores) was derived from fissure veins, as was the case a century ago. To-day, on the other hand, the output from veins is relatively unimportant, and the author does not seem to have realised how great the change has been in this respect.

The author divides his subject into the following main groups:

- I. Magmatic segregations.
- II. Contact deposits.
- III. Mineral veins.

IV. Epigenetic ore bodies.

V. Sulphuretted ore deposits mainly of epigenetic origin.

VI. Ores formed by sedimentation.

VII. Gozzans.

VIII. Secondary (clastic) deposits.

Many of these groups are by no means satisfactory, inasmuch as the deposits included in them do not properly correspond to the titles given. Thus the author quotes as examples of magmatic segregation the magnetites in gneiss of the Lofoten Islands and the Kiruna ore, although he admits that the latter ore deposit is definitely younger than the adjoining eruptive rocks and accordingly not syngenetic with these. Similarly he includes among contact deposits, by which he understands those formed under the influence of contact metamorphism at or near the boundaries of the eruptive and the stratified rock masses, a number of deposits as to which he is bound to admit that he cannot ascribe their origin to any particular eruptive rock. He describes those as krypto-contact deposits, but obviously such a description is far from satisfactory. Among his epigenetic ore bodies he includes such deposits as those of Bingham and Bisbee, where the protore is undoubtedly syngenetic, gash veins and similar deposits in pre-existing cavities, true metasomatic deposits like the red hæmatites of Cumberland, and certain residual deposits, while his group of sulphuretted ore bodies is admittedly not a natural entity and contains examples of syngenetic, epigenetic, and indeterminate modes of origin. This method of dealing with the subject creates confusion rather than clearness; it is conglomeration, not classification.

There are various mistakes in geography, which should have been avoided; for example, the Sierra de Ronda is said to be on the Portuguese coast, and Leadville in England! Moreover, the work aims at describing every deposit of importance, but there are several notable omissions.

No doubt there is room for a good, small text-book on mineral deposits, but it will have to be on different lines from those of the present one; more care will have to be devoted to classification and to the discussion of the modes of formation of the deposits, and fewer examples, and those only typical ones, must be quoted, references to descriptions of others being generally sufficient. It is probably only in this way that the student can get a clear view of this complex subject. The work at present before us does not fulfil these conditions; it may be of use for reference to the experienced mining geologist who is not likely to be led astray by it, but it is scarcely a safe book to place in the hands of a beginner.

H. LOUIS.

The Living Soil.

Das Edaphon. Untersuchungen zur Ökologie der bodenbewohnenden Mikroorganismen. Von R. H. Francé. Zweite Auflage. Pp. 99. (Stuttgart: Franckh'sche Verlagsbuchhandlung, 1921.)

"EDAPHON" is the name which, from their analogy to the plankton, Dr. Francé has coined to cover all the forms of life occurring in the soil. In spite of the very considerable amount of work that has been done in recent years on these organisms, very little of it is at present available to the general biological reader. There are text-books of agricultural bacteriology and a considerable number of scattered papers dealing with single organisms or groups of organisms from the soil, but most of these reach only the specialist. Dr. Francé has therefore performed a real service in writing a brief general account of the soil fauna and flora, its conditions of life, and the influences of the different groups of organisms on one another and on the soil.

As a general handbook to the subject, however, it suffers from one considerable defect, for during the past few years great advances have been made both in this country and in America, of which apparently Dr. Francé has as yet heard nothing, since he gives no references to any non-German work of a later date than 1912. Even a casual glance through recent numbers of the English and American journals would not only have given him many useful facts, but would also have suggested methods of technique which would have made his own investigations much more fruitful. His accounts in particular of the insects and flagellates give very little idea of the number and variety of these creatures occurring in the soil.

The observations on the ecology of the organisms would also have been more satisfactory if a little more statistical information had been given. It is not very useful to be told that in May a cubic millimetre of soil contained 15 organisms (omitting bacteria), whereas in August the number had fallen to 3, unless we are also told how much variation there is between duplicate samples taken at the same time or at brief intervals. Since Dr. Francé frequently reminds us of the close analogy between the edaphon and the plankton, one naturally recalls the wide divergences found in duplicate catches of the latter. Probably he is right in believing that the figures given are significant, but the reader who wishes to understand what are the effects of temperature, moisture, season, and the physical and chemical properties of the soil on the organisms living in it, is at a great disadvantage if he is not told just what is the degree of significance.

In spite of these defects, however, the present